55 Wound Management

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The fate of the surgical wound is sealed during the operation; almost nothing can be done after the operation to modify the wound's outcome.

A minor complication is one that happens to somebody else.

All that is visible to the patient of your wonderful, lifesaving, emergency abdominal operation is the surgical wound (Fig. 55.1.). Wound complications, although not life threatening, are an irritating source of painful, and often prolonged, morbidity, which bothers the patient and his or her surgeon alike. It is no wonder, then, that throughout generations, surgeons developed elaborate rituals to prevent and treat wound complications. Now that you are reading one of the last chapters of this book, it is hoped you are sufficiently brainwashed to deplore elaborate gimmicks and to demand pragmatic solutions instead.

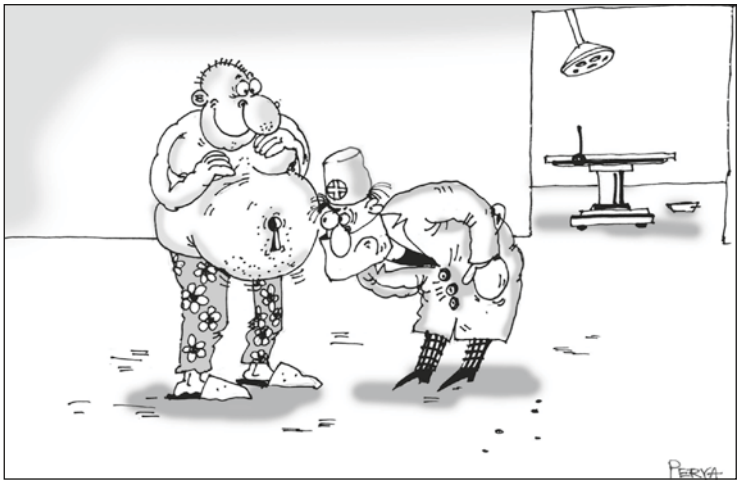

Fig. 55.1. "I hope you are satisfied with the beautiful wound, eh?"

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Definitions and the Spectrum

For practical purposes, you do not need complicated definitions used by epidemiologists or infection control nurses—the (usually humorless) creatures who tell you not to walk out of the operating room with your scrubs on…

- An **uncomplicated** wound is a sutured wound that heals uneventfully by primary intention. Note that following emergency abdominal surgery, an entirely uncomplicated wound is an exception. You don't believe us? Start to document from now on all your wounds and see for yourself the number of weeping or red and swollen wounds your patients have.
- **Complicated** wounds are extremely common after emergency surgery when prospectively assessed by *independent* observers. Conversely, when "reported" by surgeons, they become "rare" or "minor" due to our natural tendency to suppress or ignore adverse outcomes.

The spectrum of wound complications is wide and encompasses infective and noninfective complications, minor and major.

- **Minor complications** are those irritating aberrations in the process of healing that, however, do not impede primary healing of the wound: a small hematoma, a little erythema, some serous discharge. The distinction between an infectious and noninfectious process is difficult and also unnecessary. Why take swab cultures from such a wound if it will not affect therapy?
- **Major complications** are those that interfere with the process of primary healing and require your intervention: a large hematoma or a wound abscess in need of drainage.
- **Wound infection** for practical purposes is a wound that contains pus and requires drainage. Usually, such an infection represents a "walled-off" wound abscess, with minimal involvement of adjacent soft tissues or underlying fascia. Rarely, surrounding cellulitis is significant, or the deep fascia is involved, denoting a (deep) **invasive** infection.

Prevention

Surgical technique and overall patient care are of great importance in minimizing the incidence of wound infection. Rarely is one aspect of management of singular importance, but it is the sum of the parts that yields favorable results. Emergency surgery is particularly associated with wound problems for several reasons. Contamination of the wound may arise from intestinal bacteria released at the time of bowel resection or from the organisms present in the established infection that the surgery was performed to treat (Chap. 12). In addition, there is insufficient time preoperatively to reverse all conditions that may adversely affect wound healing, such as shock, diabetes, and malnutrition (Chap. 6).

Evidence suggests that tissue hypoxia, hypothermia, and poorly controlled blood sugar predispose to wound complications. Thus, try—the best you can in the few hours you have (if any at all) before operation—to oxygenate the patient better (yes, give him that oxygen mask!), warm him up and administer insulin if necessary.

When you deal with complicated wounds, you get wound complications.

Yes, this aphorism is true, and a certain rate of wound complications is obligatory and inherent in the nature of this type of surgery. Nevertheless, you should strive to keep it as low as possible. How?

Let us reiterate here the above-mentioned aphorism: **"The fate of the surgical wound is sealed during the operation; almost nothing can be done after the operation to modify the wound's outcome."** Whether your patient develops a wound hematoma or infection depends on your patient and on you and is determined during the operation—not afterward. We quote Mark Ravitch again: **"The likelihood of wound infections has been determined by the time the last stitch is inserted in the wound."**

Meticulous technique as described in Chap. 43 is paramount. Here, a few preventive points are re-emphasized:

- Operate efficiently and carefully; avoid "masturbating" the tissues
- Do not strangulate the fascia with interrupted figure-of-eight sutures of wire, Ethibond, or vicryl; instead, use low-tension continuous springlike monofilament closure—letting the abdominal wall breathe (Chap. 43)
- Do not barbecue the skin and underlying tissues with excessive use of diathermy
- Do not bury tons of highly irritating chromic (or anything else) in the subcutaneous fat
- Do not close the skin with the even more noxious silk
- Do not place contaminating colostomies in the main abdominal wound
- Do not leave useless drains in the wound (or anywhere else). Do not forget that drains increase the risk of wound infections

Transfer your meticulous technique to the ward also. Nosocomial (hospital-acquired) infection is a menace to our patients. We have already mentioned the contribution that indiscriminate use of nonindicated antibiotics makes to the emergence of resistant organisms. The prevalence of these germs as colonizers of our patients is increasing, and spread from patient to patient is a major problem. Doctors are a major vector in this spread. Wash your hands every time you touch a patient. It seems astonishing that this message has to be repeated now, but studies have shown time and again that nurses are much more meticulous in their approach to this issue than MDs. This act of handwashing after each patient contact should be so ingrained that you have a sense of incompleteness until it is performed.

Antibiotics

Antibiotic prophylaxis reduces the wound infection rate; its anti-infective effects are in fact more pronounced in the surgical wound than within the peritoneal cavity (› Chap. 7). Intraincisional antibiotics have an additional preventive role (› Chap. 43); this makes sense if you consider that the wound's defense mechanisms are much weaker than those of the peritoneal cavity. Many years ago, it was shown that systemic antibiotics are effective in preventing wound infections only if given within 3 hrs of bacterial contamination—the "effective period." **Postoperative antibiotics cannot change the fate of the wound** as they will not penetrate the area. Despite what you have been told hitherto by your local infectious disease specialists or surgical "gurus," brief *perioperative* antibiotic coverage is as effective in preventing wound infection as 7 days of post-op administration (› Chap. 47).

Non-closure or Delayed Closure of the Wound

Leaving the skin and subcutis completely or partially open following contaminated or "dirty" procedures is still advocated by some "authorities." True, it may prevent wound infection in the minority of patients who are bound to develop one. At the same time, leaving these wounds open condemns the majority, whose wounds are destined to heal more or less uneventfully, to the morbidity of open wounds, the associated problems of management, and the risk of superinfection. Look at › Chap. 43 for more details on this controversial issue.

Management

The Uncomplicated Wound

Throughout history, surgeons were fascinated with the treatment of wounds because all they could do was to manage external post-traumatic wounds. For hundreds of years, surgical leaders advocated simplicity in the management of wounds.

Felix Wurtz (1518–1574) wrote: **"Keep them as neat and clean as possible, and disturb them as little as you can; so far as may be practicable, exclude the air; favor healing under the scab; and … feed it as you would a women recovering from her confinement."**

The great Joseph Lister (1827–1912) said: **"Skin is the best dressing."** The renowned physician William Osler (1849–1919) maintained: **"Soap and water and common sense are the best disinfectants."**

But, most surgeons took literally the famous adage by Ambroise Paré (1510–1590): **"I dressed him and God healed him"** and practiced unnecessarily elaborate wound management policies.

The uncomplicated primarily closed surgical wound needs almost no care. A day after the operation, it is well sealed away from the external environment by a layer of fibrin. It can be left exposed. Isn't it ridiculous to see gloved and masked nurses changing sterile dressings on routine surgical wounds? Some patients demand their wounds be covered; cheap dry gauze is more than adequate for this purpose. The chief aim of elaborate "modern" dressing material impregnated in antibiotics, silver, or whatever is to enrich the medical-industrial complex. We do not use them. Patients with uncomplicated wounds can shower or bathe any time.

The Complicated Wound

For the complicated wound, the punishment should fit the crime. Minor nonspecific complications should be observed; the majority will resolve spontaneously. Again, starting antibiotics because a wound weeps a little serous discharge is not going to change anything; if the wound is destined to develop an infection, it will—with or without antibiotics. Major wound hematomas require evacuation, but this is extremely rare following abdominal surgery.

Wound Infections

Wound infection following an emergency abdominal operation is usually caused by endogenous bacteria—the resident bacteria of the abdominal organs breached during the operation or the bacteria that caused the intra-abdominal infection in the first place. Following noncontaminated operations (e.g., blunt splenic trauma), the bugs causing wound infections are exogenous skin residents, usually a *Staphylococcus*.

A *streptococcal* wound cellulitis may develop a day after the operation with pain, swelling, erythema, and elevated temperature. This is mentioned in all textbooks, but we have never seen one; we have also never met anyone who observed such an early *Strep* wound infection. Wound infections also may present in your private office even weeks after the operation, skewing—underestimating—your hospital infection control data (which are collected only to pay lip service to the administration's need to produce statistics).

When in doubt, do not rush to poke in or open the wound—creating complications in wounds that would otherwise heal. Instead, be patient, wait a day or two, let the infection mature and declare itself.

Remember: a "hot red" surgical wound with surrounding erythema does not mean "cellulitis." It means that there is pus within the wound that has to be drained. As a rule, removing a few skin sutures and draining the pus treats most wound infections. There is no need to lay the whole wound open if only part of it is infected. You do not need a computed tomographic (CT) scan to diagnose a wound infection (this is not a joke; this is what "modern medicine" is educating people to do). All you need do is to remove a few sutures or staples and probe the wound.

Aftercare

Aftercare should be simple. Open shallow wounds are covered with dry gauze and cleaned once or twice daily with water and soap. There is nothing better for an open wound than a shower or bath. Deeper wounds are **loosely** packed with gauze to afford drainage and prevent premature closure of the superficial layers. Antibiotics are not necessary. Do you give antibiotics after the incision and drainage of a perianal abscess? Of course not. So, why treat wound infections with antibiotics? A short course of antimicrobials is indicated when severe cellulitis is present or the abdominal fascia is involved, indicating invasive infection.

Wound swabs? Wound cultures? Gram stains? What for? As you know by now, the causative bacteria are mostly predictable (Chap. 12), and besides, how could the microbiological results change the therapy outlined in this chapter? The answer of course is that they do not. But, some wounds will become problematic, and it is then valuable to know the nature of the organism involved. The correct antibiotic can be administered without having to guess sensitivities or wait for the result of cultures. MRSA (methicillin-resistant *Staphylococcus aureus*) is currently endemic in the United States and elsewhere in the world and is increasingly responsible for our postoperative wound infections. Early treatment of complications from these wound infections is obviously desirable. Early cultures from leaking wounds do therefore have some role to play, but be sure to prevent your junior colleagues from prescribing antibiotics just because a positive culture appears.

Nurses and for-profit home care agencies push elaborate and expensive wound care methods to justify their continued involvement. Local application of solutions or ointments of antiseptics or antibiotics destroy microorganisms and human cells alike, induce allergy, and encourage bacterial resistance. **Expensive forms of wound coverage are a gimmick**. The industry is aggressively promoting various devices for **"vacuum wound therapy,"** claiming that application of negative pressure has beneficial effects on the healing of wounds. To the best of our knowledge, such claims are scientifically unfounded. Obviously, vacuum devices

offer the best solution for "productive" wounds (e.g., intestinal fistula in the middle of an abdominal wall defect;—Chaps. 50 and 52.2), but applying an expensive vacuum device on nonproductive wounds seems ridiculous to us.

Simple is beautiful. Use soap and water; for our problematic wounds, we are enthusiastic users of honey. Try it!

"I describe to my students what an injured animal does: it lies under a shady bush (rest, splint) by a water source (fluids, nutrition), licks the wound frequently (dressing changes) until it is clean and healing (time and patience)—and hope it makes them think past the gorgeous dressing promoted by manufacturers' reps." (Barry Alexander)

"Dressings on undrained wounds serve only to hide the wound, interfere with examination, and to invite adhesive tape dermatitis." (Mark M. Ravitch, 1910–1989)

"A surgeon should not wear a long tie that could dangle embarrassingly and dangerously down into a wound or incision while he leans over the patient." (Francis D. Moore, 1913–2001)